Question 1

Two events occur at the origin of the unprimed frame.

Which of the following is true?

1. $\Delta t' = \Delta t$
2. $\Delta t' = \Delta t \sqrt{1 - \frac{u^2}{c^2}}$
3. $\Delta t = \Delta t' \sqrt{1 - \frac{u^2}{c^2}}$

Question 2

A rocket leaves Earth at $t = 0$ yr and travels with velocity $3c/5$. At the point that the rocket passes the Earth it's clocks read 0 yr. It sends a light signal when its clocks read 2 yr.

Which of the following is true regarding the event in which the light is produced by the rocket?

1. $x = 2$ c yr $\quad t = 2$ yr.
2. $x = 2$ c yr $\quad t' = 2$ yr.
3. $x' = 0$ c yr $\quad t = 2$ yr.
4. $x' = 2$ c yr $\quad t' = 2$ yr.
5. $x' = 0$ c yr $\quad t' = 2$ yr.

Question 3

A rocket travels with velocity $\frac{3}{5}c$ to the right respect to a space station. Observers in the space station observe an asteroid traveling to the left with speed $\frac{4}{5}c$ with respect to the space station.

Which of the following is true of the speed of the asteroid as observed from the rocket?

1. Galilean: less than c, SR: less than c
2. Galilean: less than c, SR: more than c
3. Galilean: more than c, SR: less than c
4. Galilean: more than c, SR: more than c